



Physicochemical and biochemical approaches for treatment of gaseous emissions containing NO_x

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Abstract:

Nitrogen oxides (NO_x) are the cause of severe environmental problems such as acid rain, smog formation, an increase in ground-level ozone, depletion of the ozone layer, and global warming and can indirectly affect human and animal health. Considering its severe polluting aspects, many approaches have been utilized so far for the development of a technology that efficiently removes NO_x from the industrial gaseous emissions. These control techniques can be broadly classified as primary and secondary techniques. Primary control techniques modify the existing combustion methods to limit the production of NO_x, which includes various physical and chemical approaches, whereas the secondary NO_x control techniques involve chemical reduction of NO_x in flue gas using a chemical reducing agent such as ammonia or urea, reacting on a specially engineered catalyst surface or by absorption of the NO_x into a special chelating liquid, and then reducing the chelate-NO_x complex to regenerate the chelate using chemical and biochemical approaches, which involve compost biofilters, trickling bed biofilters, packed bed reactors, and several other types of bioreactors. The overall efficiency of the process depends on the absorption efficiency of the chelating agent, the denitrification capacity of the microorganism and the process parameters and physicochemical conditions. The authors highlight the essential features of various physicochemical and biochemical NO_x control strategies and techniques. Further, extensive research and development efforts are recommended to improve existing technology for effective NO_x control.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution

Air Pollution: Other Air Pollution

Air Pollution (other): NO_x

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Climate Change and Human Health Literature Portal

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Mitigation

Resource Type:

format or standard characteristic of resource

Review

Timescale:

time period studied

Time Scale Unspecified